* NOTICES *

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2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the immobilization and waterproofing structure of the flexible circuit board in the hinge unit of pocket mold electronic equipment, such as a closing motion or folding-type portable telephone, and a pocket mold video camera, a digital camera.
[0002]
[Description of the Prior Art] As for pocket mold electronic equipment, such as a closing motion or folding-type (henceforth "closing motion type") portable telephone, and a video camera of the pocket mold which a liquid crystal panel opens and closes, a digital camera, hinge connection of the closing motion part is made. Hereafter, a portable telephone is mentioned as an example and explained. As shown in drawing 1 , a closing motion-type portable telephone (10) connects the 1st case (20) with which the manual operation button (12), the dc-battery (13), the microphone (14), etc. were arranged, and the 2nd case (40) with which the display (16), the loudspeaker (17), etc. were arranged by the hinge unit (80), and is constituted. The cylindrical bearing (22) formed in the end face both sides or one of the two of the 1st case (20) as a hinge unit (80) was shown in drawing 8 , and (22), The bearing (42) formed in the end face of the 2nd case (40) at the same axle and (42) are connected rotatable by the hinge shaft (82) and (82). Between bearing (42) and (42) The flexible circuit board (60) which connects electrically the internal substrate (62) of the 1st case (20) and the internal substrate (63) of the 2nd case (40) is held in cylindrical covering (25) and (45) in the condition of having been wound in the shape of a loop formation.
[0003]
[Problem(s) to be Solved by the Invention] The flexible circuit board (60) inserted the terminal (66) at a tip, and (67) in a substrate (62) and (63), or soldered them, and has connected a substrate (62) and (63) electrically. When the switching action of a device was repeated and was performed, tension and slack arose [the flexible circuit board (60)], the connection with the flexible circuit board (60), a substrate (62), or a substrate (63) slackened, the poor contact might be started, and the flexible circuit board (60) might be fallen out and disconnected from a substrate (62) and (63).
[0004] Moreover, since a hinge unit (80) has a clearance between some between bearing (22), (42), cylindrical covering (25), and (45), water and moisture may invade from this clearance. The moisture which trespassed upon the interior of a hinge unit (80) might be transmitted to the inside of the flexible circuit board (60), a case (20), and (40), might go into the interior of a case, and might cause corrosion, short-circuit, etc. of a substrate.
[0005] The purpose of this invention is fixing the flexible circuit board held in the interior of a hinge unit by the simple approach, and offering further the pocket mold electronic equipment by which moisture's does not trespass upon the interior of a device from a hinge unit.
[0006]
[Means for Solving the Problem] In order to solve the above-mentioned technical problem, the pocket mold electronic equipment of this invention The 1st case (20) with which the manual operation button (12) was arranged, and the 2nd case (40) equipped with the display (16) are connected by the hinge unit (80) possible [closing motion]. By the flexible circuit board (60) passing through the interior of cylindrical covering (25) formed in the hinge unit (80), and (45) In the pocket mold electronic equipment which connected electrically

the internal substrate (62) of the 1st case (20), and the internal substrate (63) of the 2nd case (40), the pinching member (70) whose flexible circuit board (60) the interior of the 1st case (20) and/or the 2nd case (40) pinches, and (72) were arranged.
[0007] As for a pinching member (70) and (72), it is desirable to be arranged so that at least one side of the substrate path (21) which opens the interior of a case (20) and (40) for free passage, and (41) may be closed, and to prevent the invasion of water to the interior of the 1st case (20) and/or the 2nd case (40). [cylindrical covering (25), (45), and]
[0008] Moreover, it is desirable to protrude the piece of a stop (74) towards the flexible circuit board (60), to establish the stop hole (65) which fits into the flexible circuit board (60) at said piece of a stop (74), to insert a stop hole (65) in the piece of a stop (74), and to fix the flexible circuit board (60) to the interior of the 1st case (20) and/or the 2nd case (40).
[0009]
[Function and Effect] the flexible circuit board (60) should be caught from the upper and lower sides by the pinching member (70) and (72) -- since it is pressed down, although it is pulled with closing motion of a case (20) and (40) or slackens -- a substrate (62) and (63) to a terminal (66) and (67) -- falling out -- slack -- there are nothings. Moreover, omission of the flexible circuit board (60) are completely prevented by inserting the stop hole (65) of the flexible circuit board (60) in the piece of a stop (74). Therefore, the dependability of a product and endurance can be raised.
[0010] Moreover, since a pinching member (70) and (72) intercept spatially between a substrate path (21), (41), a case (20), and (40), the invasion of moisture to the interior of the 1st case (20) and the 2nd case (40) can be barred, and they can prevent the corrosion by the moisture of a substrate (62), (63), other electronic parts, etc., short-circuit, etc., and can raise the dependability of a product and endurance.
[0011]
[Embodiment of the Invention] Although the example which applied this invention to the closing motion-type portable telephone (10) is explained hereafter, this invention of it being applicable to the video camera which not only a portable telephone but a liquid crystal panel opens and closes, a digital camera, a notebook sized personal computer, etc. is natural. Moreover, the portable telephone (10) shown below is an example, and arrangement of a manual operation button, a dc-battery, a display, an antenna, etc., a configuration, magnitude, etc. are not limited to the following example.
[0012] The 1st case (20) with which the manual operation button (12), the dc-battery (13), the microphone (14), etc. were arranged, and the 2nd case (40) with which the display (16), the loudspeaker (17), etc. were allotted are mutually connected by the hinge unit (80) rotatable, and the closing motion-type portable telephone (10) has foldable composition, as shown in drawing 1 . The 1st case (20) consists of a 1st front case (23) where the manual operation button (12), the microphone (14), etc. were arranged, and a 1st rear case (24) which closes the rear face, and the dc-battery (13) etc. is arranged by the 1st rear case (24). Moreover, the 2nd case (40) consists of a 2nd front case (43) where the display (16), the loudspeaker (17), etc. were allotted, and a 2nd rear case (44) which closes the rear face.
[0013] As shown in drawing 2 , the substrate (62) with which the circuit was mounted, respectively, and (63) are built in, and various electronic parts are electrically connected to the interior of the 1st case (20) and the 2nd case (40), respectively.
[0014] The hinge unit (80) connected possible [closing motion of a case (20) and (40)] The 1st bearing (22) which protruded towards the slanting upper part from the end face both sides of the 1st front case (23), and (22), While connecting mutually the 2nd bearing (42) which protruded from the 2nd front case (43), and (42) rotatable by the hinge shaft (82) and (82) the [which holds the flexible circuit board (60) later mentioned between the 2nd bearing (42) and (42) / 1st] -- it has 2 cylindrical covering (25) and (45). In addition, bearing (22) and (42) may be prepared only in one side instead of end face both sides of a case (20) and (40).
[0015] the -- 1 cylindrical covering (25) is formed in the end face of the 1st case (20). the -- 1 cylindrical covering (25) with the semicircle barrel (26) formed in the end face of the 1st front case (23) It is crooked upward from the end face of the 1st rear case (24), and consists of quadrant radii objects (27) which said semicircle barrel (26) and tip connect. Between the end face of a semicircle barrel (26), and the end face of a quadrant radii object (27), the interior of the 1st case (20) and a substrate path (21) open for free passage are

formed. In the 1st front case (23) and the 1st rear case (24) As shown in drawing 2 thru/or drawing 4 , where a case (23) and (24) are closed the flexible circuit board (60) passing through a substrate path (21) -- up and down -- inserting -- the [and / the interior of the 1st case (20), and] -- the pinching member (70) which intercepts spatially between the interior of 1 cylindrical covering (25), and (72) are attached, respectively. A pinching member (70) and (72) suppress the tension at the time of closing motion, and slack to gap of the flexible circuit board (60) passing through a substrate path (21), vibration, and a pan, and prevent a poor contact with a substrate (62), an open circuit, etc. while they prevent that moisture trespasses upon the interior of the 1st case (20) from a substrate path (21).

[0016] As for a pinching member (70) and (72), it is desirable to constitute from an ingredient which has elasticity, such as urethane, a sponge object, rubber, and plastics. While this prevents an open circuit of the flexible circuit board (60), when the flexible circuit board (60) is pinched, it is for imitating the configuration of the flexible circuit board (60) and heightening the waterproofing effectiveness. Moreover, in order to heighten the waterproofing effectiveness, as for the width of face of a pinching member (70) and (72), it is desirable to carry out to more than the width of face of a substrate path (21). Furthermore, as shown in drawing 4 , it is desirable [the location of a pinching member (70) and (72)] to make low the pinching member (72) side by the side of invasion to cylindrical covering (25), and to prevent that the flexible circuit board (60) inside cylindrical covering (25) bends etc., so that it may be made to go around the flexible circuit board (60) greatly along with the bore of cylindrical covering (25). A pinching member (70) and (72) can be attached in a substrate path (21) or its near by carrying out adhesion etc.

[0017] Furthermore, as shown in drawing 4 , the piece of a stop (74) protrudes on the 1st front case (23) towards the 1st rear case (24) near the substrate path (21). The piece of a stop (74) fits into the stop hole (65) established by the flexible circuit board (60) so that it may mention later, and it serves as ****** of the flexible circuit board (60). In addition, the tip of the piece of a stop (74) may be plugged up and the piece of a carrier (not shown) which prevents the omission omission of the flexible circuit board (60) may be prepared in the 1st rear case (24). The above-mentioned piece of a stop (74) may be formed in the 1st rear case (24), and may be formed in the 2nd case (40) side. Moreover, you may prepare in both a case (20) and (40).

[0018] the -- 2 cylindrical covering (45) is formed in the end face of the 2nd case (40). the -- 2 cylindrical covering (45) with the semicircle barrel (46) formed in the end face of the 2nd front case (43) It is crooked upward from the end face of the 2nd rear case (44), and consists of quadrant radii objects (47) which said semicircle barrel (46) and tip connect. Between the end face of a semicircle barrel (46), and the end face of a quadrant radii object (47), the interior of the 2nd case (40) and a substrate path (41) open for free passage are formed. In the example of illustration, the semicircle barrel (46) is formed inside the 2nd above-mentioned bearing (42) at one. In the 2nd front case (43) and the 2nd rear case (44) As shown in drawing 2 , drawing 3 , and drawing 5 , where a case (43) and (44) are closed the flexible circuit board (60) passing through a substrate path (41) -- up and down -- inserting -- the [and / the interior of the 2nd case (40), and] -- the pinching member (70) which intercepts spatially between the interior of 2 cylindrical covering (45), and (72) are attached, respectively. A pinching member (70) and (72) suppress the tension at the time of closing motion, and slack to gap of the flexible circuit board (60) passing through a substrate path (41), vibration, and a pan, and prevent a poor contact with a substrate (63), an open circuit, etc. while they prevent that moisture trespasses upon the interior of the 2nd case (40) from a substrate path (41). The quality of the material of a pinching member (70) and (72), means of attachment, etc. are the same as that of the 1st above-mentioned case (20).

[0019] The flexible circuit board (60) is a flexible wiring substrate with which the terminal (66) linked to a substrate (62) and (63) and (67) were formed in both ends, as shown in drawing 6 . It is established in the location where the stop hole (65) which fits into the above-mentioned 1st front case (23) corresponded to the 1st case (20) side of the flexible circuit board (60) with the piece of a stop (74).

[0020] In addition, the flexible circuit board (60) of drawing 6 is making the abbreviation center section loosely crooked according to the width of face between a substrate path (21) and (41). Therefore, within cylindrical covering (25) and (45), with closing motion of a case (20) and (40), the flexible circuit board (60) laps, and it does not interfere, or it does not bend [stress arises and].

[0021] Assembly of the above-mentioned portable telephone (10) can be performed by the following approaches.

<<preparation process>>
- While connecting the bearing (22) of the 1st front case (23) and the 2nd front case (43), and (42) with a hinge shaft (82), carry required electronic parts, a substrate (62), and (63), respectively, and connect electrically. Moreover, a pinching member (70) and (72) are beforehand stuck on the location of a substrate path (21) and (41) a front case (23) and (43), respectively.
- Carry required electronic parts, a substrate (62), and (63) in the 1st rear case (24) and the 2nd rear case (44), and connect with them electrically. A pinching member (70) and (72) are beforehand stuck on the location of a substrate path (21) and (41) a rear case (24) and (44), respectively.
- Wind the flexible circuit board (60) so that the loop formation of a round may be formed with an abbreviation mid gear.

[0022] << -- like the shipfitter of the flexible circuit board -- >> -- a front case (23) and (43) are opened the degree of predetermined angle, and it adjusts so that both the substrates path (21) and (41) may be located in a line with a single tier. In this condition, the loop-formation part of the flexible circuit board (60) is held in cylindrical covering (25) and (45). Next, as shown in drawing 2 , it arranges so that the end of the flexible circuit board (60) may pass along the substrate path (21) of the 1st front case (23), and may be laid on a pinching member (70) and a stop hole (65) may fit into the piece of a stop (74) of the 1st front case (23), and a terminal (66) is inserted in a substrate (62). Similarly, the other end of the flexible circuit board (60) passes along the substrate path (41) of the 2nd front case (43), it arranges so that it may be laid on a pinching member (70), and it inserts a terminal (67) in a substrate. Thereby, the flexible circuit board (60) forms the loop formation around which it goes inside cylindrical covering (25) and (45) while connecting a substrate (62) and (63) electrically. It can stop that the diameter of a loop formation of the flexible circuit board (60) carries out size change when a case (20) and (40) are opened and closed, since the loop formation is formed within cylindrical covering (25) and (45), the flexible circuit board (60) is pulled or the flexible circuit board (60) slackens.

[0023] Degree [shipfitter]>> of <<rear case The 1st rear case (24) is inserted in the 1st front case (23), and the 2nd rear case (44) is inserted in the 2nd front case (43). At this time, as shown in drawing 4 and drawing 5 , the flexible circuit board (60) is put by the pinching member (72) of both the rear case (24) and (44), (72), and the pinching member (70) which counters and (70). Then, by a screw stop etc., a front case (23), (43), a rear case (24), and (44) are fixed to one, and a portable telephone (10) is assembled. In addition, an assembly sequence etc. is not limited above.

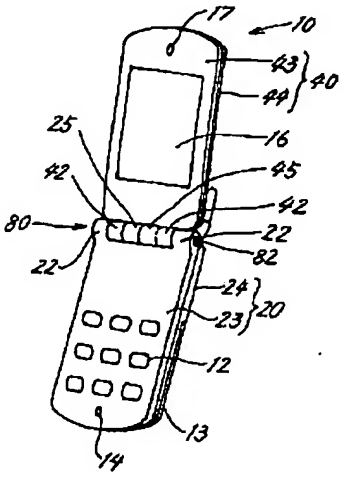
[0024] Explanation of the above-mentioned example is for explaining this invention, and it should not be understood so that invention of a publication may be limited to a claim or the range may be ****(ed). Moreover, deformation various by technical within the limits given not only in the above-mentioned example but a claim is possible for each part configuration of this invention.

[0025] For example, in the above-mentioned example, although a pinching member (70) and (72) were arranged both cases (20) and (40), you may arrange only at one side. moreover, the terminal of the flexible circuit board (60) -- both -- a substrate -- not inserting -- beforehand -- as for while, a terminal can also use for a substrate that in which connection immobilization was carried out by soldering etc., and the thing by which an internal substrate (62) or (63) were formed in the flexible circuit board (60) and one.

[0026] Furthermore, in order to prevent that the flexible circuit board (60) bends etc., when making one pinching member (70) side high and making low the pinching member (72) side of another side, as shown in drawing 7 , the rib (76) equivalent to the difference of height is protruded on the front case (23), and a pinching member (70) can also be attached on this rib (76). Thus, a rib (76) can be protruded and communalization of the components of a pinching member (70) and a pinching member (72) can be attained.

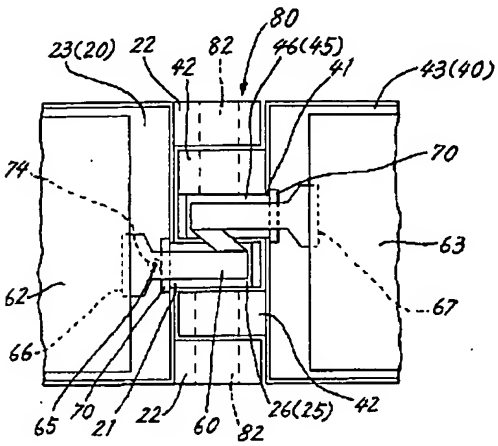
[Translation done.]

Drawing selection drawing 1



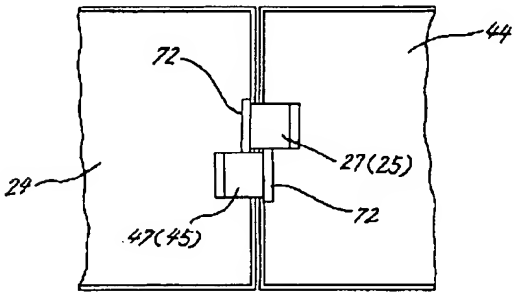
[Translation done.]

Drawing selection drawing 2



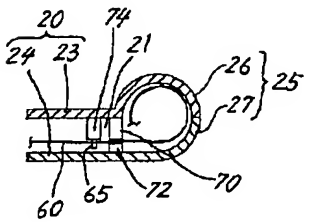
[Translation done.]

Drawing selection drawing 3



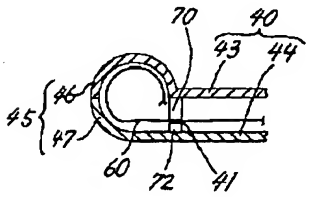
[Translation done.]

Drawing selection drawing 4



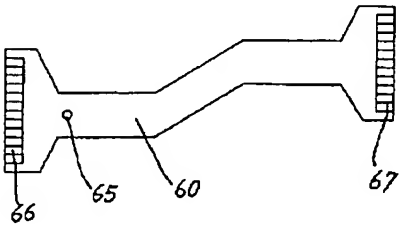
[Translation done.]

Drawing selection drawing 5



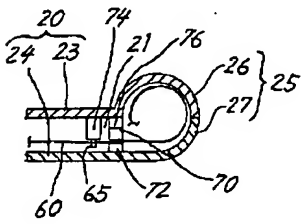
[Translation done.]

Drawing selection drawing 6



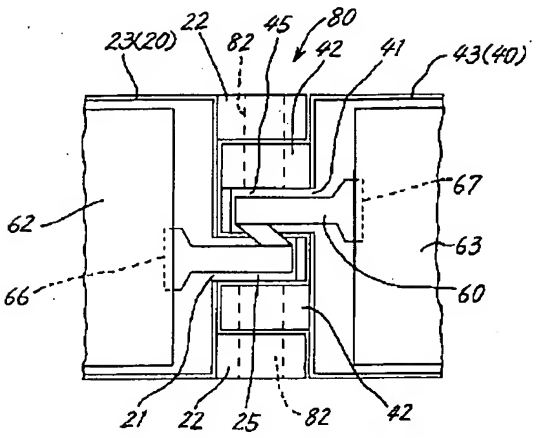
[Translation done.]

Drawing selection drawing 7



[Translation done.]

Drawing selection drawing 8



[Translation done.]